

SUSTAINABLE PRACTICES IN THE TOURISM INDUSTRY. EXPLORING THE BENEFITS OF THE CRADLE TO CRADLE CONCEPT

Ștefania Lucia BODOȘCĂ

*The Bucharest University of Economic Studies, 71131, Romania
bodosca.stefania@gmail.com*

Abstract

With all the new developments in the technology field, entrepreneurs around the world have proven that there are innovations which can be transferred and implemented into the tourism industry. This new types of business focus on social, economic and environmental sustainability that enter in the circular economy sphere, where a different mind-set is in the centre of things. This paper explores the cradle to cradle concept and its applicability in the tourism industry.

Key words: tourism innovation, sustainable tourism, cradle to cradle, eco-innovation

JEL Classification: L83

I. INTRODUCTION

The new directions towards innovation in tourism represent important steps towards sustainable development with great results in all the pillars of sustainability. Innovation in tourism is brought in discussion more and more in the context of new strategies of development and it is adopted by companies in order to have a competitive advantage, to gain a higher level of productivity and efficiency. It no longer focuses on traditional economy, the linear one but on circular economy where the impact of new technologies and public policies within European Union, have accelerated the emergences of new business models. These modifications can be seen in changes regarding the environmental, social or economic aspect in a firm that operates in the tourism industry. The most frequent innovations are the product one and they can be seen as new functions to old systems or products or come in the form of new ones that use less energy and produce less waste. Innovation is brought in discussion in the tourism and hospitality literature when is analysed alongside: i) eco innovation, ii) eco-efficiency, iii) Life cycle iv) cradle to cradle. The aim of these study is to offer an insight of what are the types of innovation that can be adopted and implemented in tourism.

Most of the studies which analyse innovation in the tourism firms, the processes through which they are adopted and the impacts on the firm are not based on secondary data but rather on the volume of sales, market analysis.

The cradle to cradle concept focuses on recycling, on the efficient utilization of resources, on the increase of involvement of the local community and tackles environmental management measures.

Furthermore, from a structural perspective, the present paper has three main sections, followed by an introduction and a section with conclusions. In the first part in the literature review it is presented a general evolution of innovation in tourism, where there are analysed the following concepts: eco-innovation, eco-efficiency and cradle to cradle. After mapping these transitions it is defined the circular economy and presented the cradle to cradle concept. We argue that there is a notable difference between these two concepts and cradle to cradle is one possibility to enable into practice the circular economy.

II. LITERATURE REVIEW

Innovation in tourism is seen as a priority direction which represent a success conversion of concepts and new technologies in products, services or processes which offer tourists added value. In this context there are great options of new innovations which have reshaped the tourist experience.

There have been made different steps in the evolution of circular economy and when we discuss this topic alongside tourism we refer to: eco-innovation, eco-efficiency, life-cycle and cradle to cradle. While research on these topics is at beginning it still has attracted great attention and we find different publications which have addressed these concepts (Alfonso Vargas-Sánchez, 2018; Saidani et al, 2018; Bohdanowicz, 2005; Scheepens, A., Vogtlander, J., Brezet, 2016).

III. ECO-INNOVATION IN TOURISM

In the literature that addresses eco-innovation we find discussed about those methods which help at the reduction of energy consumption and resources. Eco-innovation seeks to offer solutions for the current issues regarding sustainability, brings benefits to the environment, looks to improve the quality of life, creates new jobs and proposes a change regarding the material security and resource justice. Eco-innovation is a way that reconciles the environment priorities with the economic ones and leads the way for other industries. Eco-innovation looks for creation of new business models that respect the environment while remaining competitive (Bodoșcă, 2018). They have several impacts on an economy and they can be analysed from three perspectives: micro, meso and macro (Reid and Miedzinski, 2008). Defining these three directions for the tourism industry in the literature of profile is little made and they lack in methodology and practicality.

There are several classifications made for eco-innovations and one of them is realized by Andersen (2008) which regards the role of each eco-innovation: add-on, integrated, technological, organizational system innovations and general purpose eco-efficient innovations. All of these extensions of eco-innovation regard the recycling, reduction of pollution, the downsize of the use of natural recourses, favours the collaboration between different industries for new technologies and improve the overall tourist experience.

1. Add-on innovations look for an improvement of the environmental performance. Right from the start we can understand that this type of eco-innovations are solutions that can be added to the existing ones, they do not influence radically the main technologies or services. They are mostly developed by the environmental industry (Andersen, 2006).

Table 1. Eco-innovation examples in tourism industry

Company/organization	Eco-innovation examples	Key asset
Hospitality	recycling, interior design (furniture with renewable woods) eco-efficient suppliers	eco-construction
Restaurants	water saving systems vegetable garden using vertical agriculture	
Travel companies	Marketing -free trips for popular bloggers to advertise their services hybrid and electrical vehicles virtual tours	nature-based

Source: Processed by the author based on the research result

2. *Integrated innovations* refer to the process of production or the final product, they make use of energy, and put emphasize on recycling and the substitution of toxic materials.
3. Third category *alternative products* are more radical and come with solutions that are more environmentally friendly. They represent new technological paths and require a greater change regarding the production phase and consumer behavior.
4. Another category is macro-organizational eco-innovations. They are more complex and require a greater number of players: either several organizations/companies that exchange solutions regarding the production and consumption, or within different workstations.
5. The last category of eco-innovations is represented by *general purpose*. It refers to those fundamental innovations that can change an industry and they are mostly technological innovations.

Another classification for the eco-innovations which is focused on tourism sector was proposed by Almeida, Rocafort and Borrajo (2016) based on a study made on 57 tourism business that activate worldwide. They pointed out that eco-innovations are connected with products, processes, technologies, marketing and organizations development. Therefore, we have for the hospitality sector the following eco-innovations: eco-design, biodegradable amenities, the measurement of the carbon footprint, storage of rainwater or groundwater for irrigation, the use of geothermal energy, electrical vehicles for inside transport and shops that offer geothermal plants (Almeida, Rocafort and Borrajo, 2016).

Eco-efficiency in tourism

Eco-efficiency is a concept that proposes how to decrease the dependency of material resources and energy, to reduce the negative footprint of humans while it brings economic benefits and environmental benefits (Qiu, Fang, Yang and Zhu, 2017). It helps in measuring the sustainable development of tourism and which is the economic output. Eco-efficiency can help companies in developing and implementing a strategy in different areas like: transportation, accommodation, recreation activities, options of waste management or catering.

There is a very close connection between circular economy and the cradle to cradle concept as the first one proposes a decoupling economic growth from a linear approach. Circular economy refers to the whole process in which products and assets are designed and built so that there is no *end of life cycle* and new terms are used such as: repaired, reused, refurbished or repurposed. The concept of circular economy is based on 3 principles: regenerate natural systems, design out waste and pollution, extension of the useful life of products and materials (Pamfilie, Firoiu, Croitoru, 2018).

IV. CRADLE TO CRADLE DESIGN

There are more and more concepts and tools available that support a sustainable design and one of them is *the cradle to cradle* concept. This concept has been proposed by McDonough and Braungart and proposes a new strategy regarding sustainable design. The main vision regarding this concept revolves around "learning from nature". Once you start to study about this concept you realize that its more technical that you would expect and its quite hard to translate it in every day actions. It focuses on the creation of technical metabolisms and propose an industrial design for materials or products, manufacturing processes that work in a close loop. According to William McDonough (1998) cradle to cradle is built on 3 principles:

1. We can make use of the solar energy,
2. We celebrate diversity and
3. Waste becomes food.

Cradle to cradle is a concept that aims to recycle products in a closed loop circuit and looks to change the way the products are designed so that they are reused or recycled while they keep the same quality throughout the life cycle (Bodoșcă, 2018). Until now the study of this concept in the field of tourism has not been done but we can find several publications in other industries where this topic is brought in attention. Several papers have studied and pointed out the ways in which this concept can be useful for the tourism industry mostly for energetic efficiency and the design of accommodation units. An overview of the publications that study the cradle to cradle design are shown in Table 3. The research for these articles was made in several Database: ISI Web of Knowledge, Scopus, EBSCO, EconLit, REPEC, DOAJ, Cabells, JSTOR, Science Direct, SpringerLink, ProQuest, DBLP, ACM, INFOSCI with the search for cradle to cradle in tourism. As environmental issues have become more and more important tourism managers need to pay more attention to sustainable solutions and to make use of tools that can lower the impact on the environment.

Table 3 Overview of publications focusing on cradle to cradle applicability

Title And Author	Area of applicability analyse
Assessing the Ability of the Cradle to Cradle Certified™ Products Program to Reliably Determine the Environmental Performance of Products published by Bach, Minkov and Finkbeiner (2018)	environmental footprint, water foot printing, life cycle assessment
Designing cradle to cradle products: a reality check published by Bakker, Wever Teoh (2010)	day to day product development, redesign of material flows material selection strategy recycling/upcycling
Environmental impacts and benefits of the end-of-life of building materials calculation rules, results and contribution to a cradle to cradle life cycle published by Silvestere, De Brito , Pinheiro (2014)	construction and demolition waste; transportation of waste and waste processing
Sustainable industrial design and waste management cradle to cradle for sustainable development published by Haggard (2010)	recycling, waste management, cleaner production, process control, equipment modification
Product design and business model strategies for a circular economy published by Bocken (2016)	car sharing, launderettes, leasing phones,, collecting and supplying fishing nets as a raw material for carpets, Recyclebank
Circular economy and cradle to cradle in educational	eco-textile, edible film packaging

practice published by Kopnina (2018)	material health, material reutilisation, renewable energy, water stewardship, social fairness
Backcasting Using principles for implementing Cradle to Cradle published by Freek van der Pluijm, Miller and Cuginotti (2010)	strategic planning and action for sustainable development
Circular product design. A multiple loops life cycle design approach for the circular economy published by Mestre (2017)	in transportation (for the optimisation of the distribution system), for the management of the waste (recyclable materials, biodegradable materials), optimisation of production techniques

Realised by the author

All the above publications bring in discussion in a way or another the applicability and suitability of C2C in tourism industry. We can rise the conclusion that C2C has some shortcomings when it comes to real environmental performance of products but represents a great tool for companies to design more environmentally products. Measuring a product's impact in terms of its environmental burdens, the energy and raw materials used to manufacture it, and the benefits associated with its use requires a careful analysis from "cradle to cradle" when products are recycled or reused at the end of their useful lifetime.

Business that want to stand out can use several options that make use of the cradle to cradle design either for *slowing* resource loops or for product life extension. All this options can be integrated in different phases of the business such as: in the selection of the materials used daily (that have a low impact over the environment), in the processing, for the transportation, when choosing to extend the product life (upgradability, replace some parts that can bring additional functionality to the product/service/ increased durability) and when they choose to act **social responsible** and to involve in the community they make business.

The most common actions that are seen in the tourism industry and make use of the cradle to cradle design are:

- Energy efficiency. It refers to the energy that is generated only from renewable energy (windmills, solar panels, thermal energy, water heating pumps that generate energy, photovoltaic system). One of the systems that uses thermal energy is Aquifer Thermal Energy Storage (ATES). This system uses energy storage deep under the ground to heat and cool the buildings. Another way of saving energy are the windows that can come incorporated with low E glazing and shading devices to reduce heat and therefore lessen the energy used for air conditioning.
- Water-saving. With the help of different methods water is saved such in the case of showerheads that pump air through the nozzles with the water. Toilets are operated with rain water.
- Natural materials. All the materials need to be chosen respecting the principle of sustainable development. Therefore, an efficient use of materials can be realised if a control is made through each action, there is no waste and all the materials employ sustainable production and can be reused or recycled. As such firms need to include in their strategies actions that take in consideration: materials that have a low impact, reclaimed materials (those taken from another project and reused as they are), recycled materials (those reconfigured to create new products). Examples that confirm such practices are: natural products (stone, marble, granite, cork, natural rubber, sustainable sourced timber), materials that contain a low level of binding agents and constituents, materials containing resins and others.
- Management of waste. Not only that it reduces the amount of waste produced it also goes forward and pays attention to the way the waste is collected, selected and various methods of waste decompose. All these major steps diminish the environmental pollution and help in optimizing each waste material. Several businesses that activate in the tourism industry have implemented a *Waste management programme*.
- Design of new accommodation units, catering or treatment units, modernizing or the reconfiguration of old spaces. Following the principles of sustainability, the new constructions would be realized with less materials and resources, can offer the user the same comfort and are net energy producers. The first step in the case of new construction represents the selection of the location which can be done after careful multidisciplinary collaboration with specialists from other areas in order to find a land that does not have important contributions to the bio diversity character of the region. At this stage it is also considered the fulfilment of a minimum number of ecological and cultural characteristics such as: the choice of location must be made in such a way that the impact of tourists' transportation will not be that great, the rate of erosion of the land, the orientation of the building (to maximize the natural light, natural ventilation), use of facade surfaces to meet criteria like solar energy. Achieving this and many other characteristics require

holistic solutions from specialists and trying to fulfil them all is a utopian idea. But keeping in mind that the results are for a greater benefit for human and bring progress some great things can be achieved. There have been developed several guidelines that offer cradle to cradle solutions: for the water system, gases and fuels, heating systems, ventilation systems, cooling systems, electrical installations, extra low voltage systems, vertical transport systems, constructions methods and the selection of materials (Arup, 2019).

- Governance. This encompasses the role of the authorities regarding the support they can offer for implementing strategies, financial assistance and others. It is no longer a discussion around *governance within the government* but governance beyond government.

V. CONCLUSIONS

Nowadays companies need to increase their efforts to reduce emissions, waste and consume of natural resources. Cradle to cradle concept encourages to adopt and apply strategies that maximize the environmental performance either in day to day operations (areas included: water, energy, air pollution, land pollution, waste management and socio cultural environment) or in the long term decisions. This paper has evaluated several options of the C2C concept, presented them and appreciates that this tool can help companies in their quest for sustainable design while having profit.

This study tried to extend the attention regarding the sustainable practices in the hospitality and tourism industry by confirming that there are many innovations available for the companies that want to have an economic growth, while they meet the needs of the present customers and of the future generations. Nonetheless it is hard to extend the applicability of this tool to a large number of business because of the short number of suppliers of such services (products) and designers of products that have a closed loop. Implementing the solutions that this concept offers needs specialists from different areas because they require new skills as they cross the border of traditional ones.

VI. REFERENCES

1. Alfonso Vargas-Sánchez (2018) *The unavoidable disruption of the circular economy in tourism*, Worldwide Hospitality and Tourism Themes, <https://doi.org/10.1108/WHATT-08-2018-0056>;
2. Alonso-Almeida, Maria del Mar, Rocafort Alfredo, Borrajo Fernando (2016) *Shedding Light on Eco-Innovation in Tourism: A Critical Analysis*, Sustainability Journal, Volume 8, issue 12;
3. Andersen, Maj Munch (2008) *Eco-innovation towards a taxonomy and a theory*, Entrepreneurship and innovation-organizations, institutions, systems and regions, Copenhagen, CBS, Denmark, June 17-20;
4. Andersen, Maj Munch (2006) *Eco-innovation indicators*, Copenhagen: European Environment Agency; http://orbit.dtu.dk/files/115329898/2007_115_report.pdf; accessed November 13, 2018;
5. Bach, Vanessa, Minkov Nikolay, Finkbeiner Matthias (2018) *Assessing the Ability of the Cradle to Cradle Certified™ Products Program to Reliably Determine the Environmental Performance of Products*, Sustainability 2018, 10, 1562;
6. Bakker, C.A., Wever, R., Teoh & S. De Clercq (2010) *Designing cradle-to-cradle products: a reality check*, International Journal of Sustainable Engineering, Volume 3, Issue 1, 2-8, DOI: [10.1080/19397030903395166](https://doi.org/10.1080/19397030903395166);
7. Bocken Nancy et al (2016) *Product design and business model strategies for a circular economy*, Journal of Industrial and Production Engineering Volume 33, Issue 5, pp 308-320;
8. Bohdanowicz. P (2005) *European hoteliers' environmental attitudes: Greening the business*, Cornell hospitality quarterly 46(2), pp188-200;
9. Bodoșcă Ștefania Lucia (2018) *Contribuții privind strategia de dezvoltare durabilă a turismului în regiunea de nord – est a României*, teză de doctorat, Academia de Studii Economice, București;
10. Bodoșcă Ștefania Lucia, Streimikiene Dalia (2015) *Cradle to cradle: a step further for sustainable development in tourism*, Transformations in Business & Economics, Vol. 14 Issue 2B, pp 548-556;
11. El-Haggag, Salah (2007) *Sustainable industrial design and waste management. Cradle to cradle for Sustainable Development*, Elsevier Academic Press;
12. Kopnina Helen (2018) *Circular economy and cradle to cradle in educational practice*, Journal of integrative Environmental Sciences Volume 14, Issue 1, pp 119-134 <https://www.tandfonline.com/doi/full/10.1080/1943815X.2018.1471724?src=recsys> accessed 19 February 2019;
13. Mestre Ana, Cooper, Tim (2017) *Circular Product Design. A Multiple Loops Life Cycle Design Approach for the Circular Economy*, The Design Journal, An International Journal for all aspects of design, Volume 20, Issue sup1 ;
14. Pamfilie, R., Firoiu, D., Croitoru, A.G., Ionescu, G.H.I., (2018) *Circular Economy – A New Direction for the Sustainability of the Hotel Industry in Romania?* Amfiteatru Economic, 20(48), pp. 388-404.
15. Pluijm, Freek van der Pluijm, Miller Karen Marie, Cuginotti, Augusto (2010) *Backcasting Using Principles for Implementing Cradle-to-Cradle*. In: Sarkis J., Cordeiro J., Vazquez Brust D. (eds) *Facilitating Sustainable Innovation through Collaboration*. Springer.
16. Reid, A., Miedzinski M. (2008) *Eco-innovation: Final Report for Sectoral Innovation Watch*, Brighton: Technopolis Group;
17. Saidani M, Yannou B, Leroy Y, Cluzel Franç, Kendall A (2018) *A taxonomy of circular economy indicators*, Journal of Cleaner Production (doi: <https://doi.org/10.1016/j.jclepro.2018.10.014> (PDF) A taxonomy of circular economy indicators. Available from: https://www.researchgate.net/publication/328098307_A_taxonomy_of_circular_economy_indicators [accessed Nov 08 2018].
18. Qiu, Xiaoping, Fang Yiping, Yang, Xueting, Zhu Fubiao (2017) *Tourism Eco-efficiency Measurement, characteristics and its influence factors in China*, Journal of Sustainability, volume 9, issue 9;

19. Scheepens A.E., Vogtlander JG, Brezet JC (2016), *Two life cycle assessment (LCA) based methods to analyse and design complex (regional) circular economy systems. Case: Making water tourism more sustainable*, Journal of cleaner production, Volume 114, pp 257-268;
20. Silvestre J.D., Brito J, Pinheiro M.D. (2014) *Environmental impacts and benefits of the end-of-life of building materials – calculation rules, results and contribution to a “cradle to cradle” life cycle*, Journal of Cleaner Production, volume 66, issue 1, pp 37-45;
21. Schmidt, Anders (2012) Environmental performance of building products: What is important in the most common building certification schemes, Force Study summary Building certification systems, https://www.eurima.org/uploads/ModuleXtender/Publications/97/Force_Study_summary_Building_certification_systems_May_2012.pdf, accessed September 12, 2019;
22. *** (2011) The Sustainable Bathroom, Energy & Carbon, Know How Guides, Our Themes, Water, <https://www.greenhotelier.org/our-themes/the-sustainable-bathroom/> accessed January 1, 2020;
- 23*** (2019) Guideline for building services design inspired by the Cradle to cradle concept, Arup Deutschland GmbH, Berlin, Germany <https://www.arup.com/perspectives/publications/promotional-materials/section/guideline-for-building-services-design-inspired-by-cradle-to-cradle-concept>;